DOCUMENT RESUME

ED 323 660 EA 022 250

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TITLE The Transformation of Education: By Design.
PUB DATE Apr 90
NOTE 16p.; Paper presented at the Annual Meeting of the American Educational Research Association (Boston, MA, April 16-20, 1990).
PUB TYPE Speeches/Conference Papers (150) -- Viewpoints (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Administration; *Design; *Educational Change; *Educational Innovation; *Educational Planning; Elementary Secondary Education; Governance; Intergroup Relations; Learning Experience; Models; Organizational Change; School Restructuring; *Systems Analysis; *Systems Approach

ABSTRACT

A systems design framework for the transformation of education is presented in this paper. A systems approach views education as a system of interdependent problems and the design process as one of four parts of organizational inquiry. A framework for educational design is presented, which is composed of three dimensions--focus for change, scope of inquiry, and patterns of interaction. A conclusion is that organizations must learn how to initiate and sustain a comprehensive system design process for creating an effective learning environment. Two figures present models of educational design. (5 references) (LMI)

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THE TRANSFORMATION OF EDUCATION: BY DESIGN

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Paper presented at the annual meeting of the American Educational Research Association, Boston, MA, April, 1990

EA 022 250

The contents of this paper have been extracted from publications

Systems Design of Education: A Journey to Create the Future of Education.
Educational Technology Publications — (in press)

The Transformation of Education: By Design
A Professional Development Program
Far West Laboratory, San Francisco, CA

THE TRANSFORMATION OF EDUCATION: BY DESIGN

Introduction

"Intentions are fairly easy to perceive, but frequently do not come about and are not fulfilled. Design is hard to perceive. But it is design and not intention that creates the future."
(Kenneth Boulding, 1985)

Over the past two centuries, public education has gone through several "waves of reform" Each succeeding wave was in response to changing social and technological conditions. From "The Little Red School House," past the "Industrial" Model School, public education is now poised on the edge of another major effort toward reform. The perspectives that we choose to guide educational reform will make a major difference. They will contribute to the design of a genuine change in the way education is conducted or to a mere refinement of the present system.

Some reformers maintain that the future is more clearly seen from the perspectives of the past. But we are also reminded "how relentlessly the mind clings to the apparent and familiar and how perilous such blindness can be" (Gibbons, 1984). Making a shift from one world view of how things ought to be to another is often very difficult. Societal change is a condition of life and most of us do our best to "keep up with the times." But keeping up with the times keeps us wedded to the present — to the existing paradigm of thought and practice in education.

The existing educational world view is steeped in tradition and established beliefs. And these tend to deflect criticism and the increasing evidence that there may be a colossal mismatch between the present systems and the needs and requirements of the communities and learners being served. The mismatch has been recognized — repeatedly. Over a dozen national reports have raised the level of consciousness about a national educational crisis. But for the most part, the reports have failed to offer remedies beyond fixing, adjusting, or restructuring the existing system. The point of departure is what exists, particularly the system's individual components. The components become the targets for change in response to recognized problems or issues in the school or its immediate environment. Thus, the curriculum, teaching practices, class scheduling, staff development, decision making, class size, counseling programs, etc., are frequent objects for innovation. Basic premises about the educative function of society and communities are seldom questioned. Instead, the reform efforts tend to be analysis-focused and limited in scope.

In response to the various reports and recommendations, a wide variety of school improvement strategies and reform policies have been tried (Mitchell, 1989).

For example:

- Standard Setting Strategies in response to common complaints that today's schools have poor standards for both staff and students. Toughening graduation requirements, lengthening the school year, establishing accountability and supervision procedures between administration and teachers are examples.

- Staff Development Strategies focused on staff quality and ability rather than on programs or performance standards. Teacher professionalism, recruitment, training and teacher retention, and administration leadership reform are examples.

- Program Improvement Strategies to improve either the curriculum or instructional practices introducing curriculum frameworks, revising curriculum content, cooperative learning, mastery learning, and community-based learning are examples.

- Organizational Strategies including decentralization of authority, redefinition of work groups as in Team Teaching, school district consolidation, or the breakup of large districts.

- Environmental Change Strategies including parent and student choice, integrated children's services, and school/business and alliances.

Recently, "educational restructuring" has been introduced as the next wave of educational reform. The term itself connotes a variety of meanings in the educational context. It often refers to making necessary adjustments in rules, roles, and relationships so that desired changes can be made in what a school does and the kinds of outcomes it produces. But restructuring is a word that has many meanings. For example, restructuring simultaneously has been supported as a means of increasing organizational efficiency, to empower teachers, and to decrease bureaucracy so that schools can become more effective.

Despite the various educational reform movements of the past two decades, many of the major problems faced by American schools persist or have even worsened. These reform efforts have two common (and reinforcing) characteristics. First, they have tended to focus on problems and solutions within the existing systems of education. The overriding theme has been to improve, fix, or adjust the existing system by (a) doing more of the same, (b) doing the same thing better, or (c) restructuring or rearranging selected functions or processes. Second, most improvement efforts have tended to focus on a piecemeal or incremental approach to system reform. Even when a number of specific improvement activities are proposed, they are seldom organized into a comprehensive system of change or renewal.

In summary, much of the currently practiced approaches to educational improvement can be depicted as follows:

- Piecemeal, incremental, and disjointed efforts have characterized most educational improvement efforts of the last decade. And there is no blueprint for integrating the efforts. The myriad of educational improvement programs and products do not "map" into a system, they do not constitute a whole. This piecemeal and disjointed approach is grounded in two phenomena.

- One is the fragmented study of education. Educational scholarship is pursued from a variety of disciplines that can provide only a partial understanding of education. Such compartmentalized inquiry and unintegrated descriptions can not offer an internally consistent conceptual basis for educational practice and improvement.

- Furthermore, the traditional reductionistic approach still prevails in disciplined inquiry in education. It seeks understanding by analytic thinking and reducing the whole into its parts. Its search for cause-effect relationships results in linear thinking and determinism. Such a view prevails even though major paradigm shifts are occurring in contemporary science. There is a shift toward synthesis, expansionism, indeterminism, and a systemic/ecological perspective.

- Failure to integrate problems into a system (of problems). The various recommendations propose a host of improvements; but fail to connect, integrate, and organize them into a comprehensive system of change. For example, the state governors conference recommended a dozen improvement ideas without integrating them into an internally consistent program of reform. A two year study funded by the Carnegie Corporation made 58 proposals to "radically transform" schools.

The "improvement/planning approach," so widely practiced in education today, follows the traditional approach to social planning. It reduces the problem defined into manageable pieces or sub-problems and seeks solution to each. It is believed that solving those sub-problems piece-by-piece ultimately would correct the larger problem of the current crisis. But, we know that correcting what is undesirable will not necessarily ensure the attainment of what is wanted.

Therefore, despite progress made through various reform strategies and restructuring efforts, there is ample reason to believe that these are not enough. In spite of all the current improvement efforts, our educational systems are too far out of balance with the needs and realities of our society, the communities and learners. What is called for is nothing less than a transformation of education — a transformation directed by design.

SYSTEM DESIGN: THE NEEDED RESPONSE

In the course of the last couple of decades, some limitations of the perspectives, methods, and tools of analytically oriented traditional inquiry have become understood. Thus, out of necessity, systems thinking and -- as its application -- systems inquiry emerged as a new approach to disciplined inquiry. Based on systems theory and guided by a systemic world view of systems philosophy, systems inquiry orchestrates the findings of various disciplines and introduces systems approaches and methods to the analysis, design, development, and management of complex organizations and societal systems. Education is such a system.

Systems thinking helps us to understand the nature of education as a complex and dynamic system that operates in ever changing environments and interacts with a variety of other societal systems. The application of systems thinking in education enables us to explore and describe:

* the embeddedness of education as it is nested in the community and in larger societal systems;

* the purposes and boundaries of education systems as those emerge from an examination of their interaction with the environment, and an exploration of how such interaction is manifested in information and resources exchange;

* the nature of education as a complex system of interacting components, woven into a whole by patterns of connectedness, and operating at various interdependent systems levels;

* the behavior of education (as a system) and the changes that are manifested in its functions, components, and their interactions through time.

Systems thinking generates insights in ways of knowing and reasoning that empower us to pursue the kinds of inquiry described above and organize the findings of our inquiry in the form of comprehensive system descriptions (models) of educational organizations and arrangements.

The systems design approach seeks to understand the design problem situation in education as a system of interconnected and interdependent problems. It seeks to envision an education arrangement as a whole, as one that emerges — and can be designed — in view of and from a synthesis of the interaction of its parts. A system view suggests that the essential quality of a part resides in its relationship to the whole. The system and its parts should be designed from the perspective of the whole system and in view of its embeddedness in its environment.

Most current educational change efforts begin with an analysis of the existing system. Problems are identified and a plan is developed by which to improve the system. Questions such as the following are asked to guide the inquiry.

What is wrong with the system?

How can we improve it or restructure it to make it more efficient and cost-effective?

How can we provide more instructional time?

How can we improve student and teacher performance?

How can we increase achievements in the basics, in science, in critical thinking?

How can we assure more parent and community involvement?

Such questions might be appropriate in times of relative stability, when adjustments and piecemeal improvements in an existing system could bring it in line with slow and gradual changes in the environment. However, in times of turbulence, accelerating and dynamic changes, and discontinuities that characterize the current era; when a new and very different stage in societal evolution is unfolding; very different questions are needed; questions such as:

What is the nature and what are the characteristics of the current postindustrial information/knowledge age?

What are the educational implications of those characteristics?

What should be the role and the societal function of education at this new stage of societal development?

What new opportunities and resources might be available for carrying out the educational function?

What new image is emerging from all the above and from our beliefs and values that might guide the design of new systems of learning and human development? What kind of approach and what strategies will enable us to realize and implement that image?

Clearly, these are very different questions from those being asked today. This new type of questions shifts the direction of the exploration from the existing system to a societal and future generations-focused perspective.

Systems design produces a comprehensive description of a desired future system. The inquiry is guided by the values and aspirations of those involved in the design of the system and it is based on a carefully assembled knowledge base. Designers make explicit the purposes and specifications of the future system of education. They create and test alternative design solutions in their quest for developing (a description of) an ideal system that will guide their (re)design and change efforts. Initially, design should not be

constrained by issues of feasibility. Feasibility comes into play later, once the ideal is described and the question becomes — how much of the ideal we can put in place now. But the ideal will be always in view as movement toward developing, implementing, and changing the system occurs.

Systems designers are more interested in creating and sharing an ideal image of the future than simply reacting to specific problems or correcting deficiencies. The process follows a well-established system of methods. Because the process is comprehensive and the outcome is systemic, the design that is produced becomes a practical and well grounded source of information for decisions concerning organizational change and renewal.

THE DESIGN PROCESS

The design process is shown in Figure 1 as one of four domains of organizational inquiry. Each domain represents a set of interactive activities that provides input to organizational decision-making. For example, using the outcomes of analysis, a conclusion is drawn concerning any mismatch that may exist between what the educational system can accomplish and what the environment needs the system to accomplish.

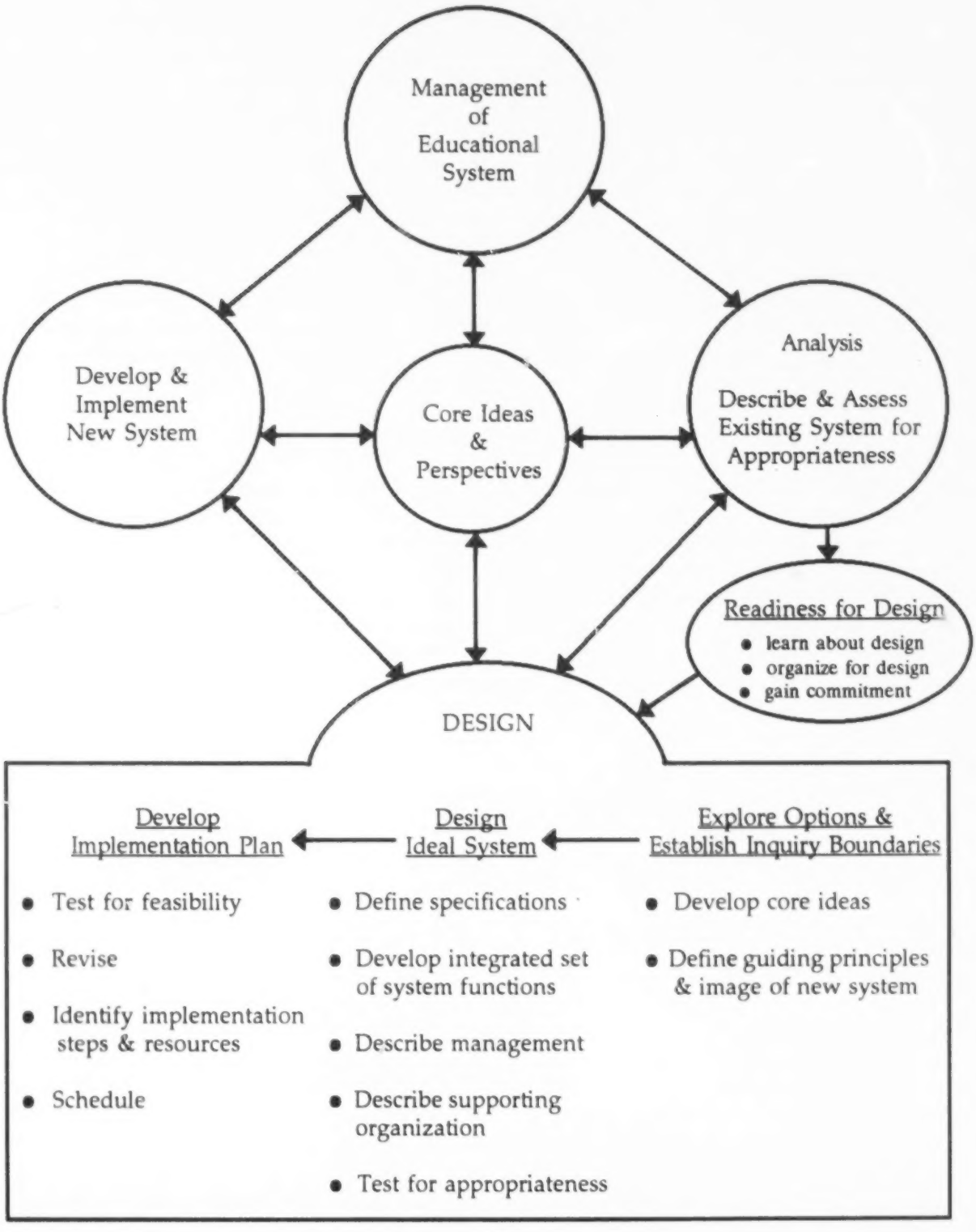
This "front-end" analysis provides a rich picture of the problem situation. The purpose of the analysis is not to identify problems that need solutions. Instead it provides the rationale for initiating a system design process. Once the rationale has been developed (e.g., the societal function of education), boundaries for the design process are established. The options selected and the resulting boundaries become the basis for developing core ideas and an image of the new system. The boundaries then guide the design of the "new system." For the most part, the educational community lacks experience with system design. It is necessary for this community and user designers to develop readiness for the process. Readiness is accomplished by (1) learning about systems design, (2) developing an inquiry plan, (3) gaining commitment, and (4) developing organizational capacity to conduct the process.

DESIGN OPTIONS

An initial issue for the design-minded organization will be the boundaries for the inquiry and of the new educational system. All organizations establish boundaries between themselves and the rest of the world. These boundaries prescribe with whom business will be conducted and the kind of relationships that will exist. Many of the boundaries that now exist between school districts and their communities reflect traditional views of educational responsibilities and roles. Given changing societal conditions and priorities, traditional boundaries may no longer serve a useful purpose. They need to be reexamined in light of present knowledge and needs and modified accordingly. When new boundaries are established, new ways of interacting with the

Figure 1

ORGANIZATIONAL INQUIRY
IN EDUCATION


Management of Educational System
Develop & Implement New System
Core Ideas & Perspectives
Analysis
Describe & Assess Existing System for Appropriateness
Readiness for Design
• learn about design
• organize for design
• gain commitment
DESIGN
Develop Implementation Plan
Design Ideal System
Explore Options & Establish Inquiry Boundaries
• Test for feasibility
• Revise
• Identify implementation steps & resources
• Schedule
• Define specifications
• Develop integrated set of system functions
• Describe management
• Describe supporting organization
• Test for appropriateness
• Develop core ideas
• Define guiding principles & image of new system

environment will follow. For example,, as the community becomes more closely involved in rethinking the educational system, community members and organizations may be called on to play new roles, to participate in helping design a new system. Their understanding of and commitment to the need to rethink education will be a critical component of readiness for a design process. The community will need to be informed and trained to participate in the design process; they will need to have access to the knowledge base to be used in decision-making; and they will need to have evaluation criteria suitable for use with the outcomes of design.

Figure 2 displays a framework for exploring educational system boundaries. The framework consisting of three dimensions encourages designers to "jump out" of existing systems and consider new options. The framework also helps dramatize differences between current approaches to educational improvement and a system design approach.

Each of the three dimensions is shown as having four general options. The options selected by designers as depicting, or constraining, their inquiry will have major implications for design.

Focus for Change Effort

- If the LEARNING EXPERIENCE LEVEL is in focus, the learner is designated as the key entity and occupies the nucleus of the systems complex of education. The primary system function is the facilitation of learning. The primary system level is the learning experience level; around which, in response to which, and in support of which we design the other systems of the complex. A learning experience focused arrangement is rarely manifested today.

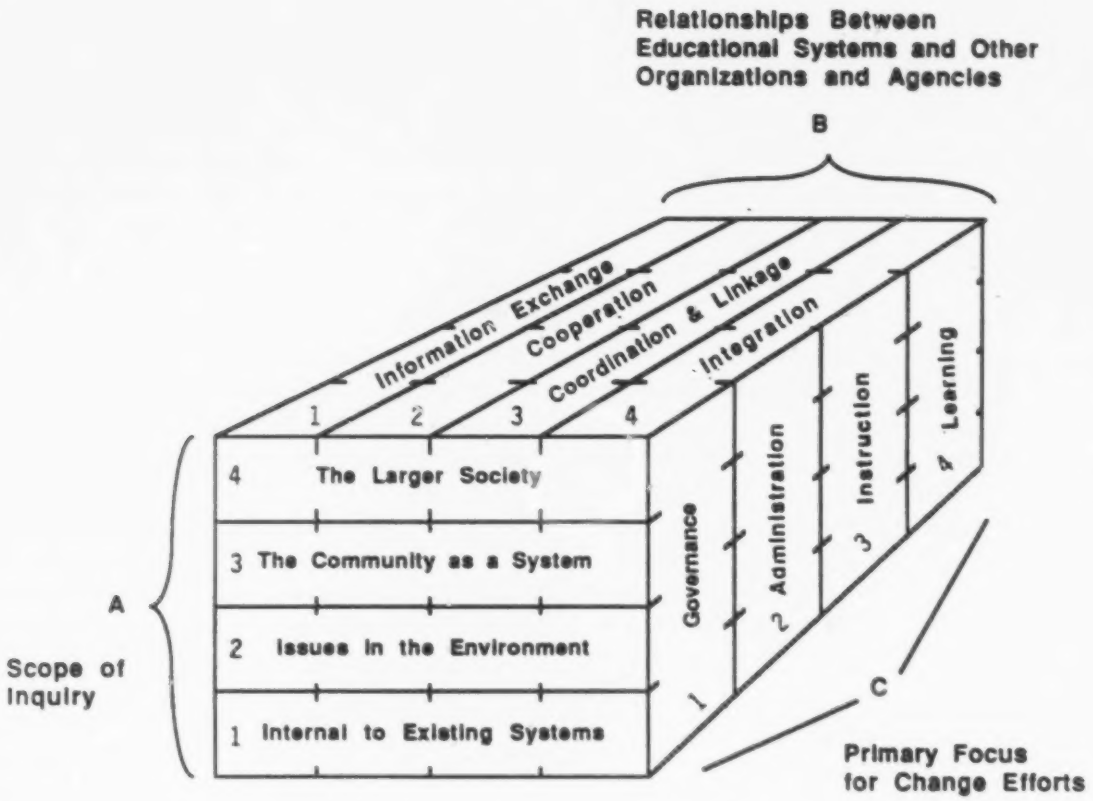
- If the INSTRUCTIONAL LEVEL is in focus, administration and governance are to provide policies and resources for its support. The instructional system defines the content and method of instruction, and students are called upon to respond to it. Some recent restructuring efforts have proposed a realignment of instructional leadership, by shifting instructional authority to groups of teachers.

- If the ADMINISTRATION is in focus it provides the goals of instruction, defines the instructional context and method and provides directives for the use of resources. Governance sets policies and is called upon to secure resources needed. This arrangement is the most frequent in our public schools today.

- GOVERNANCE is in focus when the purpose of education is indoctrination and enculturation. Top decision makers define policies, and regulations and mandate uniform curriculum and instruction.

Figure 2

Framework For Exploring Educational Redesign Options



Scope of the Inquiry

• The scope of inquiry is limited to the EXISTING SYSTEM of education. The inquiry stays within the boundaries of the current system and may explore issues surrounding management, organizational communication, instructional effectiveness, staff development, school climate, etc. This narrow scope is typical to current IMPROVEMENT programs, with a trust of making the existing system more efficient.

• At the next level we broaden the scope. We still stay within the boundaries of the existing system, but extend the inquiry in order to consider issues in the environment to which education might respond. For example, the inquiry might focus on such problems as: dropouts, drug abuse, teenage pregnancy, students at risk, economic competitiveness, etc.

• Next, the scope and the boundary of inquiry might be further extended into the entire COMMUNITY and involve a variety of societal systems, organizations and agencies that might provide resources, arrangements, and territories for learning and human development.

• At the broadest scope, we extend our inquiry into the LARGER SOCIETY and re-vision education and guide the design inquiry based on our understanding of the evolving major societal changes and transformations. We seek not only to respond to these massive changes and transformations but take an active role in them by asserting that education has a special and unique responsibility today to participate in shaping societal development.

PATTERNS OF INTERACTION

• INFORMATION EXCHANGE implies the least amount of interaction. Its projects exchange between the school and the community that provides information to the community about the school and gathers information about the community for use by the school. This pattern of interaction is the most frequent today.

• COOPERATION implies a pattern of interaction between the school and other societal institutions and agencies for the purposes of attending to complementary goals or sharing some resources.

• COORDINATION implies interorganizational linkage, and shared ownership of an educational enterprise which is mutually beneficial to the participants. Formal organizational arrangements are created for the accomplishment of shared goals of education and human development.

• INTEGRATION is the most intensive and the highest level of interorganizational arrangement for creating systemic relationships. If integration were to be considered, the entity that we now call school may become a component of a

community-wide system of learning and human development. Such a system would be constituted from the integration of systems of the public and private sectors, community organizations, and various agencies that have the potential to offer resource and arrangements for learning and human development.

SUSTAINING THE INQUIRY: THE ORGANIZATION THAT CAN LEARN

Organizational learning is not the same as individual learning, yet organizations learn only through the collective experiences and actions of individuals. Organizations, over time, develop policies, norms, and ways of behaving that are unique and under stable conditions, serve the organization well. But if the organization holds on to these conventions in the face of substantial change in the environment, it runs a serious survival risk. The basic questions are: How can the organization through its structures, processes, and interactions develop the capacity and capability to engage in inquiry about itself (Argyris & Schon)? How can the organization learn how to learn - to be able to correct deficiencies in performance via feedback as well as to know when the existing system needs to be redesigned because it is no longer compatible with the needs and condition of the environment it serves. How can the organization learn how to initiate and sustain a comprehensive system design process?

Organizations that can learn have created a learning environment. Developing staff knowledge and skills related to helping the organization develop and improve its quality is of the highest priority. Generic learning and design skills are developed across the organization rather than relying solely on the specialization. Organizational capability and capacity to respond to needs and opportunities is thereby created.

Organizations that can learn believe in the usefulness of the concept of variety. An insistence on variety in developing options, defining alternatives, making choices, establishing and using criteria for testing possibilities replaces the power of ego or the forces of conventional decision-making. Maximizing the interests and preferences of many takes precedence over maximizing the interests of a few. Inclusion and collaboration are key elements of a strategy that emphasizes organizational learning.

Learning organizations create conditions that encourage staff to self-organize, to form semi-autonomous groups or structures to respond to opportunities, initiate innovative efforts, or explore possibilities. The capacity to self organize counteracts the overly bureaucratic tendencies that can stifle organizational development. A primary responsibility of leadership is to initiate structures and arrangements that encourage and facilitate productive interactions among staff concerning the important issues of the organization. These interactions are not seen as simply symbolic to satisfy the need for people to be heard. Instead the interactions are formalized as functional arrangements by the leadership and are a primary mechanism for studying issues, gathering information, creating alternatives, making choice decisions, into addition to carrying out a variety of other tasks the organization needs to perform.

Productive interactions, those intended to serve the organization's needs for information, designs, plans, preferences, tend not to be accidental. They are productive because their legitimacy has been established by the organization. Organizational structures reflect the recognition of constant change and the need to respond systemically and creatively. Responsibility and accountability are distributed among smaller groups but all members of the organization are kept involved in organization-wide issues so as to maintain a system point of view and attain a mutual perspective and purpose.

Learning organizations have developed the capability to process both information and resources efficiently and effectively (Miller, J.G.). This capability is accepted by many organizational researchers as a critical aspect of organizational health and viability. For example, the learning organization acquires needed and relevant information for decision-making (internal and external), screens it for relevancy, translates it for meaning, communicates it to those who must use it at a rate that can be comfortably handled, analyzes it to assess system performance, applies and uses it for decision-making, reports it to stakeholders, and stores it in retrievable form. These processes, performed well, will have a substantial impact on what the organization becomes and how well it performs. Similarly how well the organization acquires, and utilizes resources (people, material, money, equipment) will determine overall effectiveness.

IN CONCLUSION

The designing organization stands out from others. It can initiate a disciplined inquiry about what education ought to be, produce a comprehensive design of an ideal educational system, test it for feasibility, develop enabling organizations capable of implementing and operating the new system, and in response to the pace of continuing change, maintain the inquiry and design process. This is a tall order and organizations that can do these things are highly sophisticated.

Rethinking and redesigning the educational system requires a temporary suspension of belief about the "rightness" or inevitability of the present system. It means to imagine an ideal system of education that can serve the society, the community and its learners — whoever they might be. The completed new design is a description of the desired future system that guides designers as they consider implementation and feasibility issues. Its most striking characteristic is that design aspires to create the future of education rather than, as most reform efforts do, simply react to events and problems.

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